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**Management Plan
for the Coachella Valley Preserve System**

and
Environmental Assessment

November 2000



A Sikes Act Plan
Habitat Management Plan
Area of Critical Environmental Concern Management Plan
Ecological Reserve Management Plan

Prepared by the
Center for Natural Lands Management

TABLE OF CONTENTS

I. Introduction.....	3
II. Background	
A. Preserve System History.....	3
B. Relationship to Federal/State Law and Plan Conformance.....	6
III. Relationship to Other Regional Conservation Programs	
A. Existing Conservation Programs.....	6
B. Current Conservation Planning Efforts.....	7
IV. Preserve Site Characteristics	
A. Ecosystem Processes.....	8
B. Biological Resources.....	11
C. Existing Improvements.....	13
D. Current Issues - Threats.....	13
V. Management Goals and Objectives	
A. Ecological Goals and Objectives.....	16
B. Programmatic Objectives.....	17
VI Management Strategies.....	18
A. Monitoring Framework.....	20
B. Adaptive Management.....	25
C. Research.....	26
D. Habitat Restoration.....	26
E. Exotic Weed Control.....	26
F. Guidelines for Sensitive Species.....	27
G. Public Use.....	27
H. Cultural and Fossil Resources.....	29
I. Real Estate and Land Acquisition Issues.....	29
J. Coordination and Partnerships.....	30
VII Funding and Reporting Mechanisms.....	30
VIII Literature Cited.....	32
IX Decision Record.....	34

I. Introduction

The effective management of the Coachella Valley Preserve System is critical to meeting protection goals of the Habitat Conservation Plan which established the preserve system in 1986 (Anon. 1985). This plan represents the third iteration of management plans developed to guide and focus the management of the preserve system. The first plan was written in 1986 and the second in 1995. While long term goals remain the same, each iteration has set short term objectives which serve those goals. The objectives evolve as conditions change, objectives are successfully met, and technologies change and are improved. Periodically, it is vital to assess progress toward goals, review completion of past objectives, review methodologies, and to set new objectives.

This management plan has been developed with the input, cooperation, and review of: the Bureau of Land Management (BLM), the U.S. Fish and Wildlife Service (USFWS), the California Parks Department, the California Department of Fish and Game (CDFG), The Nature Conservancy (TNC), the Center for Natural Lands Management (CNLM) and the University of California's Deep Canyon Desert Research Station.

II. Background

A. Preserve System History. In 1980 the Coachella Valley fringe-toed lizard (CVFTL), *Uma inornata*, was listed as threatened by the federal government, and listed as endangered by the state of California. To achieve adequate protection for this species a Habitat Conservation Plan (HCP) was developed under the authority of the 1982 amendment to the federal Endangered Species Act (ESA) (Anon. 1985). The HCP was completed in June 1985, and approved by the USFWS in April of 1986. This was the first HCP completed after the 1982 amendment to the ESA and as such has, to a greater or lesser degree, provided a guidepost to all subsequent HCPs. The Coachella Valley fringe-toed lizard HCP was signed by the County of Riverside, the nine cities of the Coachella Valley and the USFWS. The signing of the HCP allowed the USFWS to issue a Section 10(a)(1)(B) permit to the cities and County, allowing those signatories the ability to "take" CVFTL as long as the provisions of the HCP were met.

The CVFTL HCP provided for the creation of three separate preserves, with the intention of protecting separate sand sources and separate, viable population of CVFTL (Figure 1) in each. The names for the three preserves used in the original HCP are slightly different in this document for both simplicity and to avoid confusion. The three preserves are together referred to as the Coachella Valley Preserve System; separately they are the Thousand Palms Preserve (called the Coachella Valley Preserve in the HCP) located north of Interstate 10 and Bermuda Dunes, the Willow Hole Preserve (called the Willow Hole-Edom Hill reserve in the HCP) located on the western edge of Edom Hill - north of Varner Avenue and east of Mountain View, and the Whitewater River Preserve (called the

Whitewater River Floodplain Reserve in the HCP) located south of Interstate 10 between Indian Avenue and Gene Autry Trail. Approximate funding levels for the creation of the preserve system was as follows:

The Nature Conservancy	\$ 2,000,000
USFWS (LWCF)	\$ 9,300,000
CDFG (WCB)	\$ 1,000,000
BLM (through land exchanges)	\$ 6,000,000+
Mitigation Fees	\$ 7,000,000+

Mitigation fees of \$600/acre were collected by each of the cities and the County when grading permits were applied for within each of the jurisdictions. The fees were held, invested and dispersed by TNC at the direction of the Coachella Valley Preserve Management Committee, made up of CDFG, USFWS (Refuge), BLM, and TNC. The fees remained at \$600/ acre until a total of \$7,000,000 dollars was collected. This milestone was achieved in 1999, at which point the mitigation fee dropped to \$100/acre. Unless amended, the fees will remain at this level for the duration of the 30 year 10(a)(1)(B) permit, (2016).

In 1997 the Center for Natural Lands Management initiated a step-wise transition process with TNC, initially acting as TNC's agent with regard to Preserve System management issues, and eventually, in 2000, taking over all Preserve System responsibilities previously held by TNC. These responsibilities include hiring a Preserve Director, managing all public use facilities and issues, coordinating all monitoring and habitat management activities, providing annual reports, serving as a voting member on the Preserve Management Committee, and receiving, holding, investing and dispersing mitigation funds under the direction of the Preserve Management Committee. None of these responsibilities supersedes the authority and responsibilities of individual partners in matters pertaining to their properties. TNC remains a significant landowner within the Thousand Palms Preserve with a seat on the Preserve Management Committee.

Ownership, and therefore jurisdiction and responsibilities, within each of the three preserves varies considerably. The Thousand Palms Preserve is made up of the USFWS Coachella Valley National Wildlife Refuge, a CDFG Ecological Reserve, a BLM Area of Critical Environmental Concern (ACEC), the Indio Hills Palms State Park, as well as lands by the Center for Natural Lands Management (CNLM).

The Willow Hole Preserve is made up of both BLM ACEC lands as well as lands owned by the Coachella Valley Mountains Conservancy (a State Agency). The Whitewater River Preserve is owned by the Coachella Valley Water District (CVWD) but is under a management agreement to BLM to provide ecological management for the length of the

Section 10(a)(1)(B) Permit (30 years, or until 2016). In 1990 the adjacent Indio Hills Palms State Park was added to the preserve system as a portion of the Thousand Palms Preserve. State Parks was then added as a voting member of the Management Committee. owned by TNC and CNLM. Despite this varied ownership, the Coachella Valley Preserve System strives to provide for cooperative management for all its sites under the coordination of the Coachella Valley Preserve Committee. Approximate current ownership within the Preserve System is as follows:

Ownership	Acres	Percent
Thousand Palms Preserve		
Bureau of Land Management	9,774	50
U.S. Fish and Wildlife Service	3,709	23
CA Parks Department	2,060	14
CA Dept. Fish and Game	528	4
The Nature Conservancy	1,161	8
CV Water District	112	1
Private	15	<1
TOTAL	17,359	
Willow Hole Preserve		
Bureau of Land Management	1,863	93
CV Mountains Conservancy	131	7
TOTAL	1,994	
Whitewater River Preserve		
CV Water District (Managed by BLM)	1,149	98
Bureau of Land Management	25	2
TOTAL	1,175	
CV Preserve System Total	20,245	

B. Relationship to Federal/State Law and Plan Conformance. The Coachella Valley Preserve System Management Plan is written under the authority of: the Federal Land Policy and Management Act of 1976 [43 United States Code (U.S.C.) 1701-1782, Public Law (P.L.) 98-540]; the ESA as amended [16 U.S.C. 1531 et seq., P.L. 93-205]; National Wildlife Refuge Administration Act [16 U.S.C. 668 dd]; Fish and Wildlife Improvement Act [16 U.S.C. 7429]; Sikes Act [P.L. 93-452/95-420]; the State of California Public Resources Code Div. 5, 5080.30, Chapter 5.2.

This plan complies with: the Coachella Valley Preserve System Memorandum of Understanding (as amended January 1991); the BLM-CDFG Master Memorandum of Understanding of June 1983; BLM-USFWS Memorandum of Understanding of December 1986; the BLM-TNC Memorandum of Understanding of March 1990; and Addendum No. 2 (1984) to the Master Memorandum of Understanding between BLM and CDFG which provides for comprehensive wildlife habitat management plans to be developed in cooperation with both agencies, under Title II of the Sikes Act.

This plan conforms with: the *California Desert Conservation Area Plan* (BLM, 1980, as amended); the California Desert District Fire management Activity Plan (BLM, 1994); CVFTL HCP (1986); the CVFTL Recovery Plan (USFWS 1985) and the following USFWS Biological Opinions: 1) Public Equestrian and Hiking Trail System within the Coachella Valley Preserve, Riverside Co., California (1-1-84-F-52); 2) Protective Fencing of Three Preserves in the Coachella Valley, Riverside Co., California (1-1-86-F-53); 3) Right-of-Way grant to the Coachella Valley Water District (CVWD) (1-1-84-F-17); 4) Leasing of Land for Wind Energy Development (1-1-82-F-114) and 5) BLM initiated Wind Energy Development Biological Opinion (1-6-99-F-49).

Two amendments have been made to the CVFTL HCP. One, signed in 1999, transfers all duties, responsibilities, and authorities, previously held by TNC to CNLM. The other, signed the same year, allows the use of CVFTL HCP mitigation fees to acquire and manage lands within the designated sand source corridor to the Thousand Palms Preserve.

III. Relationship to Other Regional Conservation Programs

A. Existing Conservation Programs. Joshua Tree National Park occurs roughly three miles north of the northern boundary of the Thousand Palms Preserve. The Park includes the watershed where significant amounts (at least 5%, N. Lancaster and N. Meek pers. comm., and up to a third, estimated from recent (2000), Ikonos satellite imagery) of the aeolian sand feeding the sand dune habitat of the Preserve originates. There is wildlife movement between the Preserve and the Park as well. Desert bighorn sheep have been observed within the Preserve at least twice over the past ten years; they most likely came from sheep populations within the Park. Bobcat, coyote and kit fox populations within the Preserve, because of the relatively small size of the Preserve, likely depend on regular

movement and exchange between the open space areas north of the Preserve and the Preserve itself to maintain genetic and population viability. Over long time spans, Park - Preserve movements of smaller animals likely occur as well. Using a longer view, the movement of wildlife between the Park and the Preserve may be extremely important if climatic changes impact current habitat suitability.

The connection between the Preserve and the National Park, in terms of physical processes and wildlife movement, was recognized as the Coachella Valley Preserve System was being conceptualized and designed in 1984. Original Preserve designs included the protection of a broad area between the Park and the Preserve. Primarily to reduce short term costs, the private land between the Preserve and the Park was not included in the final design. There was an assumption that these lands would not develop soon, or at high enough densities, to impact the connection between these two conservation areas.

Other conservation lands with an influence on the Coachella Valley Preserve System include the San Geronio Wilderness, Mission Creek and the Big Morongo Canyon Area of Critical Environmental Concern. Each of these areas forms all or a portion of the sand source to the Willow Hole and Whitewater River Preserves. The corridors that provide for sand movement between these sand sources to the Preserves have been inadequately protected. Again, assumptions were made that no development would likely occur within active floodplains, therefore direct acquisition would be unnecessary.

B. Current Conservation Planning Efforts. Early in the 1990s there was a growing recognition that the Coachella Valley Preserve System was insufficient to provide long term population viability for the floral and faunal elements of the Coachella Valley that are either endemic, near endemic, or have a significant portion of their population occurring within this valley. These species have the potential of receiving protective listing from either the State or federal endangered species laws, and so present a barrier to future development planning that would otherwise be consistent with the CVFTL HCP. In response to this risk, a multiple species HCP (MSHCP) planning effort is underway. This planning effort has identified the Coachella Valley Preserve System as a cornerstone for the MSHCP effort, and builds on that system to provide increased viability for the ecosystems the preserve system protects. All programs and strategies proposed in this plan are designed to be consistent with those proposed MSHCP.

In 1990 the Coachella Valley Preserve System's Management Committee contracted with two separate researchers to determine the relative contribution of various watersheds in providing sand to the Thousand Palms Preserve dune ecosystem (Lancaster et. al 1993, Meek and Wasklewicz 1993, Wasklewicz and Meek 1995). Both investigations came up with the same conclusion: a series of canyons emerging from the Indio Hills, immediately north of the town of Thousand Palms have provided the vast majority of sand that

currently makes up the dune fields on the Preserve (farther back in time there is evidence that Thousand Palms Canyon was a more prominent sand source). Those canyons and the corridor connecting them to the Preserve are not in conservation ownership. The Coachella Valley MSHCP has as one of its major objectives the protection of that sand transport system (as well as protecting a corridor to Joshua Tree National Park). In recognition of the importance of protecting the sand source-corridor for the Thousand Palms Preserve, the USFWS has proposed a refuge expansion to include this critical component of the CVFTL habitat. An amendment to the CVFTL HCP adopted in 1999 already allows use of mitigation funds to be used to acquire and manage lands within the sand source-corridor area. CDFG has also initiated a process to allow acquisition of these lands with Wildlife Conservation Board (WCB) funds. Finally, an Army Corps of Engineers - CVWD proposed flood control project in this same area may serve to provide some additional acquisition funds.

IV. Preserve Site Characteristics

A. Ecosystem Processes. The Coachella Valley is one of the driest regions of California. Nevertheless, the resources protected within the preserve system are tied to periodic, extreme rainfall events that erode and sort sediments out of the surrounding mountains and alluvial fans, depositing them in wind corridors (Lancaster et. al 1993, Meek and Wasklewicz 1993). The aeolian processes further sort the sediments, and move them further down wind where the sediments accumulate in dunes and dune hummocks which provide habitat for the CVFTL (as well as a large array of other species restricted to the dune environments). The CVFTL prefer loose, active dunes and dune hummocks with sand grain sizes between 0.1 mm and 0.5 mm diameter (occasionally up to 1.0 mm) (Norris 1958). Historically, prior to the development of roads and railroads through the Coachella Valley, there was approximately 100 square miles of nearly continuous dune habitat forming a “sand sea” here (Dean 1978, Ingrid Eleck pers. comm.) (Figure 2). The distribution of historic aeolian habitat, occupied by CVFTLs, is from Barrows (2000), is based on valley-wide surveys and U.S. Soil Survey maps, but is somewhat at variance from maps depicted in the CVFTL HCP (as are the number of acres of historic occupied habitat) (Anon 1985). This sand sea was fed by multiple sand sources, ranging from the San Gorgonio and Whitewater River channels, to Mission Creek, Morongo Canyon, the many canyons of the Indio Hills, and from portions of the Little San Bernardino Mountains. The many sand sources have created a complex dynamic of sand volumes and movement rates.

At the western end of the valley, in a region including the Whitewater River Preserve, rainfall levels are generally at least twice that of the central and eastern valley. The watersheds are also much larger in the western valley. The San Gorgonio River, the Whitewater River and Mission Creek are all sand sources for this region. The combination

of these physical characteristics results in more frequent large rain events with more frequent sand deposition in the wind corridor as compared to other portions of the valley. This western region of the valley also has the highest wind velocities due to the venturi effect caused by the narrow San Geronio Pass. Taken together, the western end of the valley tends to receive more frequent sand input and at higher volumes, but transports that sand eastward faster, than other portions of the Coachella Valley. Much of the habitat in that area thus has an ephemeral character; CVFTL occur in relatively low numbers when the habitat is depleted and then expand dramatically when the habitat is replenished by a new storm event. These western aeolian habitats tend to be more cool and mesic than those further east, and tend to have a higher plant species richness. This species richness is expressed both in the number of species and abundance of individual perennial shrubs accentuated by the occurrence of rare annual plant species. The endangered Coachella Valley milk-vetch, *Astragalus lentiginosus* var. *cochellae* appears to reach its highest densities there (pers. obser.). Reflecting this difference in vegetation patterns, CVFTL at the western end of the valley tend to have a larger plant component to their diet than do lizards further east (Barrows, *in prep*). Their reliance on perennial vegetation may be somewhat of a buffer to impacts (in terms of reproductive success) of single year droughts. Multiple year droughts degrade even the perennial vegetation, and the reproductive success of the lizards there declines.

The Willow Hole Preserve's sand source is primarily the Morongo Canyons and Mission Creek (Weaver 1981) (Figure 2). Storm events large enough to generate an influx of new aeolian sand occur rarely here, but sand entering into Willow Hole gets trapped by an extensive mesquite bosque, so the rate of sand leaving the site is relatively low. The amount of active aeolian habitat available to the CVFTL population there is considerably reduced from 1986 when the site was dedicated. A flood in the later part of that decade eroded nearly half of the habitat off the site and it has been very slow to recover.

The Thousand Palms Preserve's primary sand source has been identified in studies by Dr. Nicholas Lancaster (University of Nevada, Reno) and Dr. Norman Meek (California State University, San Bernardino) to be a series of relatively small canyons in the Indio Hills west of Thousand Palms Canyon (Lancaster et. al 1993, Meek and Wasklewicz 1993). Thousand Palms Canyon and the watershed above it was identified as a secondary, but important, sand source for this site's dunes (Figure 2). The relative importance of any of the sand sources is at least somewhat dependent on the stochastic nature of storm events, in terms of the storm's localized intensity. Storm events appear to be rare in all of these sand sources. The last significant input of sand into this site's dune field may have been prior to 1939. Aeolian movement here is not as fast as in the western valley where wind velocities are much higher, but the dunes of the Thousand Palms Preserve are still always moving toward the southeast (graphically depicted in Figure 3). This dune field consists of largely unvegetated active dunes, surrounded by a creosote bush - saltbush dune hummock area where aeolian activity varies from year to year. This site is the driest and

hottest of the three preserves, and has the lowest perennial plant species richness and abundance. CVFTL diets here vary considerably from year to year, with a more diverse diet in high rainfall years, and an almost exclusive consumption of harvester ants (*Pogonomyrmex*) in dry years. The annual CVFTL reproductive success varies positively with annual rainfall here as well (Barrows *in prep.*).

Taken together, the historic habitat quality of the Coachella Valley sand sea was probably far more consistent in the Valley's center, where the communities of Cathedral City, Rancho Mirage, Palm Desert, Indian Wells and La Quinta now exist. That is where much of the aeolian sand accumulated. The more peripheral areas to the west and north of the sand sea had (and have) a much more dynamic sand deposition and transport pattern. The more consistent habitat in the Valley's center is now either beneath cement and sod, or the processes of sand transport have been permanently disrupted. Those more peripheral, dynamic habitats are still largely intact, and that is where the preserve system has been created (Figure 1). The historic size of the Coachella Valley's dune field, or sand sea, meant that while the local dynamics of this system changed the localized habitat quality for the CVFTL over time, there were always substantial areas within the sand sea where the lizards could thrive. El Nino years, or years with above average rainfall, increase the productivity of the dunes, but may cause localized dune stabilization due to increased plant cover. Prolonged wet periods promote higher nitrogen and phosphorus levels in the dunes due to decayed vegetation, which then fertilize and enhance subsequent years' plant growth (including exotic weeds), promoting increased dune stabilization. La Nina years, or years with far below average rainfall, result in overall reduced productivity on the dunes, but may have reactivated some of the previously stabilized areas due to the lack of annual vegetation cover coupled with strong winds (Lancaster et. al 1993). Development of the railroad, numerous roads, and now country club style developments have resulted in the irreparable stabilization of over 95% of the dune - sand sea of the Coachella Valley. In the fragmented dune system that now exists, the local dynamics become increasingly important. If the dunes within a given preserve become increasingly stabilized, or the sand is largely blown off the preserve before a new storm event can bring new sand to the site, the remaining CVFTL population may be at risk of local extinction. By designing the three preserves around separate sand sources with different dynamics, the chance that all sites would be at risk at the same time is reduced.

Although the focus of the Coachella Valley Preserve System is to protect CVFTL and their habitat, both the Willow Hole and Thousand Palms Preserves have important wetland habitats, primarily desert fan palm oases. Eleven different palm oases occur within these preserves. Their occurrence is due to groundwater brought to the surface along the San Andreas earthquake fault zone. Changes in the integrity of the fault zone due to earthquake movements affect the amount of water available to the palm oases, and so the size of the oases can change over time.

B. Biological Resources. There are six major natural communities protected within the Coachella Valley Preserve System. These include sonoran desert dunes (which could be sub-divided into active dunes, active or inactive dune hummocks, and ephemeral dune hummocks), mesquite hummocks, sonoran creosote bush scrub, desert saltbush scrub, desert fan palm oases, and sonoran cottonwood - willow riparian forests. Species occurring within the preserve system that are targeted in the Coachella Valley MSHCP effort and their habitat - natural community affinities are listed below, along with the CVFTL and other Coachella Valley restricted species. The preserve where each species occurs is also indicated (WWR = Whitewater River Preserve, WHP = Willow Hole Preserve, TPP = Thousand Palms Preserve). Bold type indicates particularly large populations at that site. The relative magnitude of the populations has been determined by extensive monitoring of the sites over the past 15 years and associated inventories (Barrows 2000).

Species	Habitat Affinity
Coachella Valley fringe-toed lizard, <i>Uma inornata</i>	Active dunes, active and ephemeral dune hummocks. WWR, WHP, TPP
Palm Springs ground squirrel, <i>Spermophilus tereticaudus chlorus</i>	Mesquite hummocks, dune hummocks WWR, WHP , TPP
Palm Springs pocket mouse, <i>Perognathus longimembris bangsi</i>	Inactive dune hummocks, sandy soils (not rocky) with creosote bush scrub WWR, WHP, TPP
Western yellow bat, <i>Lasiurus (ega) xanthinus</i>	desert fan palm oases TPP
Desert tortoise, <i>Gopherus agassizii</i>	creosote bush scrub - very rare, marginal habitat TPP
Flat-tailed horned lizard, <i>Phrynosoma mcallii</i>	dune hummocks (active and inactive) WWR TPP
Desert pupfish, <i>Cyprinodon macularis</i>	Riparian habitat (introduced) TPP
Least Bell's Vireo, <i>Vireo bellii pusillus</i>	Riparian forest, primarily in migration. WHP (one breeding record), TPP
Yellow Warbler, <i>Dendroica petechia brewsteri</i>	Riparian Forest - migration only WHP, TPP
Yellow-breasted chat, <i>Icteria virens</i>	Riparian forest - migration and breeding WHP, TPP

Southwestern willow flycatcher, <i>Empidonax eximius traillii</i>	Riparian Forest - migration only WHP, TPP
LeConte's thrasher, <i>Toxostoma lecontei</i>	dune hummocks, mesquite hummocks, desert washes WHP, TPP
Barrows' dune beetle, <i>Edrotes barrowsi</i>	Active dune areas WWR , WHP, TPP
Coachella giant sand treader cricket, <i>Macrobaenetes valgum</i>	Active dunes, active and ephemeral dune hummocks WWR , WHP, TPP
Coachella Jerusalem cricket, <i>Stenopelmatus caluilaensis</i>	Sandy washes, ephemeral hummocks WWR
Coachella Valley grasshopper, <i>Spaniacris deserticola</i>	Creosote bush scrub - primarily on <i>Tiquilia palmeri</i> WHP, TPP
Coachella Valley milk-vetch, <i>Astragalus lentiginosus</i> var <i>coachellae</i>	All active dune types. WWR , WHP, TPP
Mecca aster, <i>Xylorhiza cognata</i>	restricted to rocky areas in Indio Hills. TPP

C. Existing Improvements. The Thousand Palms Preserve dune habitat area is fenced, as is the entire Willow Hole Preserve.

Public use facilities exist on the Thousand Palms Preserve in Thousand Palms Canyon, including a historic log cabin used as a visitor center, restroom and picnic facilities, and nearly 10 miles of hiking trails (some of which are available to equestrians).

A series of 4 residences are owned by the Center for Natural Lands Management and are part of the Thousand Palms Preserve. Two of these structures are used by CNLM to house long-term volunteers who make a commitment to work at least 20 hours per week for the preserve, doing facilities maintenance, habitat management, and docent coordination tasks. One building serves as the preserve office for the CNLM staff associated with the preserve. Another building, sometimes referred to as the "hooch" is available to house shorter term volunteers or staff from any of the partner agencies. Storage for equipment and herbicides is available in one out building, and an equipment "bone yard" is also available.

D. Current Issues - Threats.

1. The most acute threat to the Preserve System is the lack of protection of sand sources and sand transport corridors to any of the three preserves (Barrows 1996). The sand source and transport corridor to the dunes of the Thousand Palms Preserve are in grave danger of being completely blocked by the expanding town of Thousand Palms. Single family dwellings already partially block the corridor, and there is an approved development that would further block sand movement into the preserve. Early versions of maps proposing designs for the Thousand Palms Preserve included the USFWS proposed critical habitat for the CVFTL which captured this sand source and transport corridor. This area was ultimately removed to reduce costs; this area had been designated in the CVFTL HCP for low density development zoning (Barrows 1996). An acquisition program has been initiated to purchase parcels in order to protect the sand corridor.

The sand corridor to the Willow Hole Preserve has also been partially blocked by single family dwellings and extensive planting of tamarisk trees. Development growth is also occurring north of Interstate 10, along Palm Drive, which will further block sand movement from the Morongo and Mission Creek Washes to the preserve. Land acquisition, to maintain this corridor, has also been approved.

Meek and Wasklewicz (1993) indicated that the percolation ponds west of the Whitewater River Preserve may have a slight impact of aeolian sands being delivered to that preserve. They suggested that under low flow flood events the ponds could impede flows. Substantial sand deposition has occurred on the Whitewater Preserve in the early 1980s and the early to mid 1990s (Muth and Fisher pers. comm., Barrows pers. obser) both as a result of El Nino weather patterns, indicating that processes supplying sand to the preserve still function. Additional analysis by a fluvial geomorphologist may provide additional information on this issue.

2. Sand loss, due to natural down wind movement, while variable between preserves, is more or less constant within a site. A prolonged period with no large storm events bringing new sand into a preserve could result in sand depletion exceeding accumulation. That infrequent, stochastic nature of sand flow into the preserves, creates a potential risk to the CVFTL populations. Although the dynamics of the dune habitat at a given site is a natural process, the fragmented nature of the current habitat configuration is not. Having three separate preserves with separate sand sources buffers the risk somewhat, however losing even one site (in terms of CVFTL population viability) seriously compromises the goals of the CVFTL HCP and the ability to maintain CVFTL populations in perpetuity.

3. Several weed species pose a potential threat to the dune ecosystem. Exotic annual plants including Russian thistle (*Salsola tragus*), a mustard (*Brassica tournefortii*), and a grass (*Schizmus barbatus*), all commonly occur on the dunes and have a potential to reduce the habitat suitability of the dunes. The impact of these weeds is twofold. First, there is a concern that these weeds catalyze and accelerate stabilization of the dunes, and

once stabilized inhibit reactivation of the dunes. Of these three weed species, *Schizmus* appears to have the greatest potential to promote stabilization. Its roots and above-ground structures remain intact, binding the dune surface, years after it germinated. It is not clear whether these weeds promote dune stabilization or take advantage of naturally inactive dunes and dune hummocks. Secondly, there is a concern that these weeds compete with and exclude native species, reducing the overall species richness of the dunes. In some years the *Brassica* forms a near closed canopy, and very well may inhibit native species, but it is not clear whether the impacts result in an unwavering trajectory to a loss of biodiversity. The control of any of these weed species will be difficult at best, and will depend on methodology not yet developed. It is therefore important to better understand the impacts of these weeds before devoting resources to their control. A study that included describing the response of CVFTL to various plants, including *Salsola*, indicated that the CVFTL do not avoid *Salsola* and that hatchling CVFTL often utilize it for cover (Barrows 1997). The relative value to CVFTL of *Salsola* versus *Dicoria canescens*, a native species with similar habits, has not been studied. The competitive interaction of *Salsola* and *Dicoria*, if any, has also not been studied. Still, there is no indication that initiating a *Salsola* control program is warranted at the densities of *Salsola* currently occurring on the preserves.

4. Off road vehicle (ORV) trespass on the dunes is one of the most severe threats to CVFTL habitat (Luckenbach and Bury 1983). ORVs reduce native plant cover, reduce fossorial arthropods, (both reduce food resources for the lizards), and run directly over and kill CVFTL. Although initially a problem, ORV trespass in the Thousand Palms Preserve has been largely under control for nearly 10 years. This control was achieved through fencing, diligent repair of broken fences, and active patrolling from BLM and USFWS law enforcement personnel. ORV trespass on this preserve is now reduced to less than 10 incidents per year. ORV trespass at the Whitewater River and Willow Hole Preserves is still a significant problem. At these preserves fencing has been incomplete, fence breaks are infrequently repaired, and agency law enforcement personnel have been reduced.

5. Two species of tamarisk, *Tamarix ramosissima* and *Tamarix aphylla* occur within the preserve system. In the riparian habitats tamarisk has a higher water consumption than any of the native trees, and thus reduces the water available to native plants and surface water available to wildlife (Barrows 1993, 1998). Tamarisk is an aggressive competitor in riparian areas and will eventually dominate habitats to the exclusion of the native plant species. While some wildlife species tolerate tamarisk forests, numerous studies have documented that such forests are significantly depauperate as compared to riparian forests dominated by native species. Tamarisk was once abundant in all of the palm oases and riparian areas of the Willow Hole and Thousand Palms Preserves. It has now been controlled within the Thousand Palms Preserve (Barrows 1993), with the result of greatly expanded native riparian forests. Nearly a kilometer of new forest has become established

since the tamarisk removal and new pools of water have formed where there was once only dusty tamarisk leaf litter. Annual search and removal of new tamarisk seedlings is still required here, but the effort is minimal. There are still many *Tamarix aphylla* occurring in and around the dunes on the Thousand Palms Preserve. This species rarely reseeds itself; the individuals here were transported in floods or were specifically planted during past agricultural efforts. These trees have in some cases served to slow aeolian processes and hold dunes on the preserve that would otherwise be lost to the southeast, but the dune stabilization that results renders these sites largely unsuitable for CVFTL. These trees also provide nesting habitat for CVFTL predators such as loggerheaded shrikes, greater roadrunners, and kestrels. While all are native predators, the tamarisk allow them to occur in areas they would otherwise avoid due to the lack of nesting opportunities. Tamarisk still occurs in low to moderate numbers at the Willow Hole Preserve as no efforts have begun to control it there.

6. A refugium population of endangered desert pupfish was introduced into the Thousand Palms Preserve in the late 1980s. In preparation for that introduction, many of the exotic resident fish species were removed. This eradication was largely successful, although one exotic fish species and several other exotic non-fish aquatic species remain today. Those exotics include mosquitofish, bullfrogs and a crawfish species. All of these species have been implicated in competing with and/or preying on desert pupfish, although more than 10 years after the initial introduction, the introduced pupfish continue to thrive. Aside from the pupfish, these exotic species have, either individually or collectively, reduced the native amphibian community species richness in Thousand Palms Canyon. Canyon tree frogs, Great Basin toads, Woodhouse's toads, red-spotted toads and western toads have all been historically present in this canyon. Of these, only Woodhouse's toad appears to be currently present in large numbers, and the tree frog appears to have been extirpated (Barrows pers. obser).

7. As increasing urbanization surrounds the preserves it will fragment and isolate the preserves, impacting movements of area dependent wildlife such as kit foxes and bobcats. While not specific targets of the CVFTL HCP or the MSHCP, these species are sometimes thought of as indicators of complete, healthy trophic webs. None of the preserves are, by themselves, large enough to maintain a viable population of these species; their population viability is probably dependent on movements to and from larger conservation areas such as Joshua Tree National Park, and the San Geronio Wilderness. Increased urbanization brings with it loss of existing habitat corridors.

8. Feral pets, especially dogs traveling in packs, present a real threat to wildlife species on the preserves. Currently these dog packs are most common in the riparian and palm oases habitat on the Thousand Palms Preserve, but their tracks are also seen in the dune areas. Researchers at the Whitewater River Preserve see dog packs often. Domestic pets enter the preserves from surrounding urban areas, thus impacting wildlife within the preserves,

at least initially, most intensely along that urban-natural community interface. Increasing urbanization surrounding the preserves is likely to increase the number of feral pets and the impact they have on the native wildlife.

9. An additional threat caused by increased urbanization is the concomitant increase in automobile traffic. As traffic increases there will be an increased wildlife mortality on roads surrounding the preserves.

V. Management Goals and Objectives

A. Ecological Goal and Objectives. The overall goal of the preserve system is to protect and maintain three separate viable populations of CVFTL in perpetuity. In support of that goal, the following objectives have been indentified:

1. Maintain sufficient acreage of appropriate CVFTL aeolian habitat within each of the three preserves to support viable populations.
2. Protect the processes that maintain the natural dynamics of the dune ecosystem.
3. Control exotic species that either impact the CVFTL directly, or negatively impact their habitat quality.
4. Protect and maintain a desert ecosystem, with associated native flora and fauna, that surrounds, supports and buffers the CVFTL habitat.
5. Support research endeavors that increase our knowledge of CVFTL ecological dynamics and requirements, and enhance our ability to meet our ojectives and goals.

B. Programmatic Objectives. The ability of managers to successfully meet ecological goals and objectives is at least partially dependent on a public that supports the overall goal of the preserve, or at least supports the open space that the preserve system maintains. This requires a continuous educational process for Coachella Valley city and county managers, planners and elected officials, state and federal public agency decision makers, and the voting public. A “public” that finds some inherent value in the existence of the preserve system is much more likely to support actions that give additional protection to the preserves. This may be manifested in support for additional land acquisitions, in protesting development projects that in some way compromise the preserves’ integrity, or in being extra eyes and ears to try and stop illegal trespass or trash dumping in and around the dunes. An educated and supportive public become all the more important as the Coachella Valley continues to grow in population and the potential for conflicts along the edge of the preserves increases. Clearly the protection of CVFTL

and other wildlife species is paramount, so on-site education and access opportunities must not conflict with that prime directive. An important objective for the preserve is to inform the Coachella Valley human community and associated public officials of the value of the preserves.

VI. Management Strategies

All management actions on the Coachella Valley Preserve System must be in response to an identified threat to the preserves and be in support of the ecological and/or programatic objectives identified for the preserves. A list of proposed management actions, tied to identified threats and/or management objectives follows. Lead agency responsibilities, where appropriate, are indicated in parentheses.

Threat: Unprotected sand sources.

Objective: Maintain CVFTL habitat and natural processes.

Management Action : At the Thousand Palms Preserve, acquire lands within the identified sand source and corridor via USFWS refuge expansion (Figure 3), CDFG-WCB acquisitions, MSHCP funding and purchase through CVFTL HCP mitigation funds. Once Acquired, new lands need to be fenced, posted, and patrolled (**CNLM, USFWS**). There is also an acute need to work with CVWD and Army Corps of Engineers to insure that their flood control proposals are not in conflict the Preserve System's management objectives (**USFWS, CDFG, CNLM**). At the Willow Hole and Whitewater River Preserves, acquire lands in fee or through easements in identified sand corridors. Newly acquired lands need to be fenced along preserve perimeters and patrolled regularly (**BLM, USFWS, CDFG, State Parks, CNLM**).

Threat: Sand loss without replacement.

Objective: Maintain CVFTL habitat / viable populations.

Management Action: Throughout the Preserve System, implement a remote sensing monitoring program that allows assessment of both aeolian habitat quality and quantity. With agreement from the Management Committee, develop threshold levels, beyond which management action is called for. Management may include surface disturbance in stabilized habitat, artificial augmentation (trucking in new sand), or other, yet to be determined actions. Sand fencing on the down-wind side of the preserves may need to be installed to reduce down-wind sand loss. All such management will be implemented within an adaptive management framework (**CNLM, USFWS**). At the Thousand Palms Preserve, promote restoration of previous agriculture areas by removing barriers to sand

movement (USFWS).

Threat: Exotic weeds, tamarisk

Objective: Maintain CVFTL habitat / viable populations, protect natural processes, remove deleterious exotic species, promote research that benefits CVFTL management.

Management Action: Support research efforts to determine if exotic weed species have deleterious impacts on CVFTL or on overall ecosystem integrity, and on effective control measures if necessary (CNLM). Monitor exotic weed population trajectories and dynamics (CNLM, CDFG). Where a deleterious impact is identified, and control measures are available, implement an adaptive exotic weed control program (CNLM, USFWS). Remove all tamarisk trees within preserve areas with highest priority on up-wind tamarisk locations (BLM, USFWS, CNLM). At downwind locations in CVFTL habitat, replace removed tamarisk trees with sand fencing (CNLM, USFWS).

Threat: Off road vehicle trespass.

Objective: Maintain CVFTL habitat / viable populations.

Management Action: Fence and sign all CVFTL habitat areas within the Preserve System (CNLM, USFWS). Conduct regular law enforcement patrols (USFWS, BLM, CDFG, State Parks).

Threat: Feral pets.

Objective: Remove deleterious exotic species, promote and maintain a healthy desert ecosystem.

Management Action: Remove feral animals in the most humane manner possible (USFWS, CNLM). If the problem continues to increase, initiate a public education program on appropriate pet stewardship at the urban - wildland interface (CNLM).

Threat: Exotic aquatic species.

Objective: remove deleterious exotic species, promote and maintain a healthy desert ecosystem.

Management Action: Focus on bullfrog control at the Thousand Palms Preserve and thin out emergent aquatic vegetation periodically to aide in exotics control (CNLM).

Threat: Loss of desert pupfish open water habitat due to over growth of aquatic vegetation.

Objective: Maintain adequate amounts of open water habitat.

Management Action: Thin aquatic vegetation on a regular basis. (CNLM, CDFG)

Threat: Loss of wildlife corridors, urbanization.

Objective: Promote and maintain a healthy desert ecosystem.

Management Action: Acquire important habitat connections between preserves and

larger protected areas (**all partners**).

Threat: Insufficient awareness on the part of the public as to the value of the Preserve System.

Objective: Encourage public support for Preserve System.

Management Action: Continue controlled public access program on the Thousand Palms Preserve in non-CVFTL habitat areas. Provide educational literature to the interested public (**CNLM**). Offer limited, guided public tours on CVFTL habitat (1-3 tours annually) (**CNLM, USFWS**). If outside funding was to become available, build a short boardwalk that would allow the public access to view a small portion of the dune area (all partners). Work with the local media to provide a number of preserve positive reports each year (**CNLM**). When appropriate, meet with elected officials to inform them of Preserve System related issues (**all partners**).

A. Monitoring Framework. Data derived from monitoring forms the basis for evaluating the success of the Preserve System's goal and attendant objectives. Monitoring efforts need to be of value in providing insight to managers regarding the impacts of their management actions and to provide early warning of population declines that are outside "natural" oscillations. Hypothesis based monitoring that predicts population responses to environmental fluctuations, is the best design for achieving that measure. For long lived species, demographic population data fed into a hypothesis based design, provides the best opportunity to give the desired early warning to alert managers to needed actions.

Since 1986 preserve managers have been conducting non-hypothesis based monitoring of the relative CVFTL population on each of the three preserves (Barrows et. al 1995). Six transects were created initially to track CVFTL populations; four were on the Thousand Palms Preserve, and one each on the Willow Hole and Whitewater River Preserves. The transects were permanently located, non-randomly, on what was considered appropriate CVFTL habitat in 1986; each were 1000 m x 10 m belts surveyed simultaneously by two biologists. Each of these transects was censused six times in late spring (late May to early June).

In 1990 there was a change in the CVFTL monitoring protocol. Partially due to the difficulty in securing sufficient time from the various agency partners to participate in the surveys, and partially due to the recognition that the transects on the Thousand Palms Preserve all demonstrated the same annual oscillations (Figure 4), the number of transects on the Thousand Palms Preserve was reduced from four to two. Secondly, due to a desire to obtain better information on CVFTL demographics, a second series of surveys was conducted in the Fall (late September to early October). Due again to partner time

limitations, only the two transects on the Thousand Palms Preserve were monitored in the Fall. These Fall data provide a measure of the CVFTL hatchling production. Coupled with the Spring census data, managers are then able to assess changing reproductive success and winter survivorship in relationship to environmental variables such as annual rainfall. The relationship between rainfall and number of First, due partially to the hatchlings seen in the Fall is very close (eight out of ten years) at the Thousand Palms Preserve (Figure 5), although at the Whitewater River Preserve that relationship appears to be more complicated (Muth and Fisher pers. com.)

Figure 4. Relative changes of *Uma inornata* population levels on two transects at the Thousand Palms Preserve.

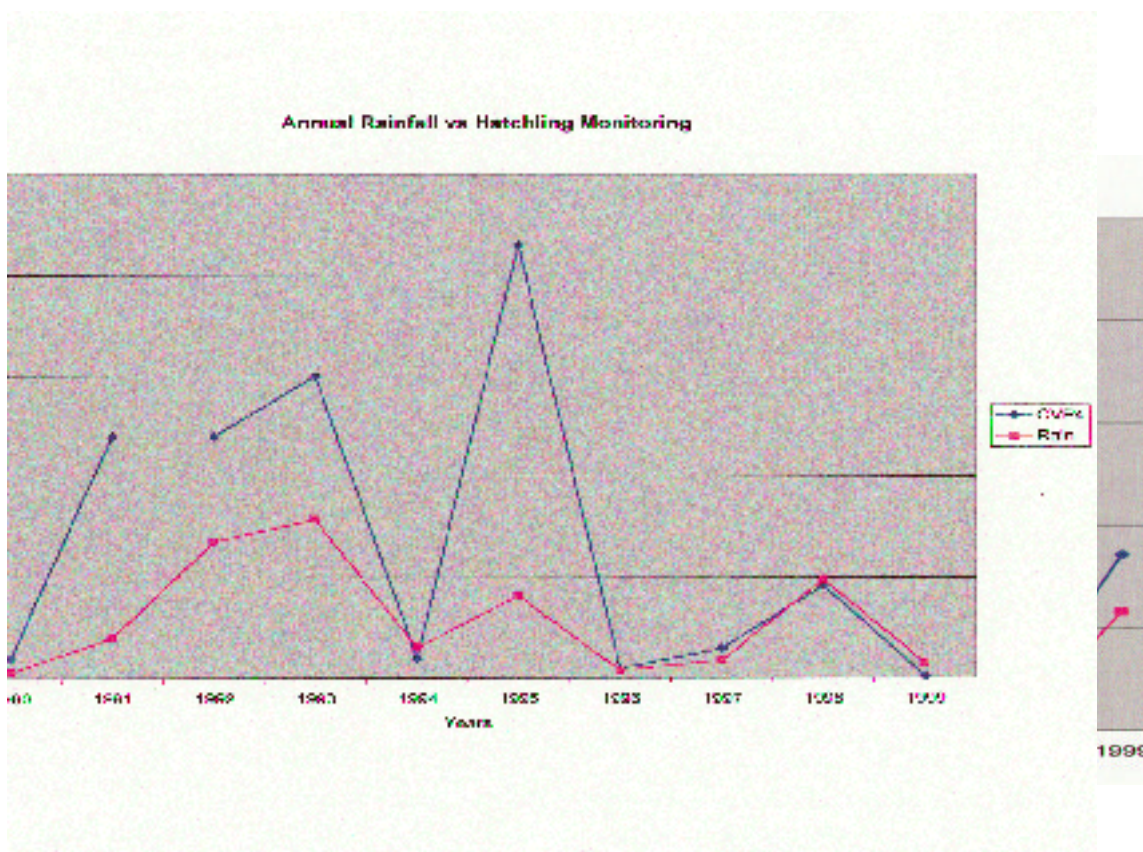


Figure 5. The relationship between annual rainfall an CVFTL hatchling numbers.

These monitoring data now provide the beginning of a baseline data set for assessing departures from expected CVFTL numbers and demographic relationships in the future. They do not offer insights into the habitat quality trajectories, causative factors for population declines if they occur, or a measurement of the sufficiency or appropriateness of management actions. This CVFTL monitoring program will be continued, but now will be coupled with additional environmental variables beyond just annual rainfall. These variables will include an assessment of the amount and quality of habitat available to the CVFTL, annual measures of arthropod (especially ant) abundance (ants are an important food item for the CVFTL), and exotic weed abundance and trajectories. A conceptual model of how these various environmental attributes impacts the CVFTL (and other aeolian species) is depicted in Figure 6. These additional variables will be measured through a combination of remote sensing via satellite imagery, with GIS analyses and synthesis, with ground truthing at a series of stratified random, GPS identified, points that capture the abundance and diversity of habitat variation found on the preserves (Figure 7). Stratified random sampling offers substantial advantages over simple random sampling or systematic sampling because it allows for the recognition of distinct habitat types and for proportional random samples within those habitat types without an inordinate of samples

(Hayek and Buzas 1997). This insures that all habitats of interest will receive adequate sampling, as opposed to simple random sampling which is only appropriate in more homogeneous habitats. The actual number of points that will be required will be determined after preliminary data allows some estimates of variance for the variables. At each point, or at some random subset of the points, exotic weed abundance, ant abundance (via pitfall trapping or mound counts), and sand compaction (and possibly mean sand grain size) will be measured. Based on observations and data gathered to date, hypotheses for how CVFTL numbers respond to these variables are as follows:

Reduction in native harvester ant abundance correlates with a reduction in CVFTL numbers, although when the CVFTL diets are more diverse (less focused on ants, lizard reproduction appears to be higher. Ants do provide an essential food source to allow the lizards to survive prolonged drought.

Increased sand compaction correlates with a reduction in CVFTL numbers. A reduced mean sand grain size may also be correlated with fewer CVFTL.

Increased exotic weeds reduces habitat quality and increase sand compaction, correlating with a reduction in CVFTL numbers.

Reduced total area of active aeolian habitat correlating with a reduction in CVFTL numbers.

Using the various measures of habitat quality and abundance, coupled with measures of CVFTL numbers and demographics, an early warning system of unnatural CVFTL population trajectories will be created. The monitoring program will be adaptive in the sense that we will continually ask whether the variables are in fact correlated with CVFTL numbers and whether there are other or additional variables which better correlate to threats to CVFTL population viability. If better metrics are available, the monitoring program will evolve to encompass those metrics. This allows for appropriate adaptive management to focus and evaluate management actions toward the control or mitigation of identified threats.

While conducting the CVFTL censuses and while measuring variables at the random habitat points, any observation of associated aeolian species will be recorded. Sand-treader crickets are captured during ant inventories, round-tailed ground squirrels will be heard giving their warning squeaks while traversing habitat, flat-tailed horned lizards will be encountered occasionally as will Coachella Valley milk-vetch. All these observations will be quantified and reported to the management committee along with CVFTL monitoring data. While the recording of these associated animal species has value, they occur at such low densities, or are so difficult to locate that the data will be insufficient to allow change detection. We will have to rely on habitat model assumptions (unless

substantially more management funds are allocated) that as long as we track sand compaction, native ant abundances, dune associated beetles (*Cryptoglossa laevis* and *Batulius setosus*), CVFTL, and weed variables, we will assume that other target species population numbers will correlate with those measured values. We will continually encourage any effort to validate those assumptions.

This monitoring program is considerably more ambitious than the monitoring conducted prior to this date. It will require the commitment of staff from all the partner agencies and/or the use of seasonal interns to complete. The monitoring program will be coordinated by CNLM with the strong support of all partners.

A second monitoring program has been created to assess progress at restoring a previous agricultural field on the Thousand Palms Preserve. This program includes sampling at a series of pitfall arrays in the restoration (6 arrays of six pitfalls each) and adjacent creosote bush - dune hummock habitat (4 arrays of six pitfalls each). The goal here is to identify those species most sensitive to habitat quality and then to track their abundance as the restoration area moves toward a more natural condition. Those species that have been identified to be good indicators, defined in terms of habitat affinity and whether they occur in sufficient numbers to allow change detection (Barrows 2000, Barrows et. al *in prep*), include:

Species	Dune - Dune Hummock Preference	Restoration Area Preference
Beetles		
<i>Cryptoglossa laevis</i>	+	-
<i>Batulius setosus</i>	+	-
<i>Niptus ventriculus</i>	+	-

The monitoring protocol recommended above (for looking at CVFTL habitat quality at a series of random points coupled with remote censusing) may also be sufficient to track the progress of restoration, since the random points will include the restoration areas. The random points include a pitfall trapping array as well, so similar data could be gathered. The sufficiency of the random point monitoring to replace the existing pitfall arrays will be evaluated in 2000 by using both methods simultaneously. If the pitfall arrays are found to be redundant, they will be discontinued.

B. Adaptive Management. The cornerstone of adaptive management is employing an appropriate monitoring program that allows for the evaluation of management strategies. The monitoring program described above provides a landscape scale evaluation of habitat conditions and change. While this sort of evaluation provides an invaluable baseline from which to evaluate management efficacy, any experimental management technique may require additional, focused monitoring to evaluate site specific effects. The protocols employed in an adaptive management scenario will, to the extent applicable, use the same protocols used in the landscape level monitoring. Candidates for adaptive management within the Coachella Valley Preserve System include:

If any exotic weeds that invade the preserve system are deemed through research to threaten the processes that maintain the habitat or directly negatively impact the CVFTL, an experimental control program should be developed.

If the amount of active dune and/or sand hummock habitat begins to decline in a unidirectional trajectory, various methods could be employed to stimulate more sand movement. Those methods include activating stabilized areas by removing vegetation and discing / excavating the sand surface layer. Test excavations have revealed stabilized aeolian sand may be many meters deep in some areas, and if activated could serve to supply CVFTL habitat with sand until a storm event brought more sand to the preserves through natural processes. This would be implemented in an experimental / adaptive manner at relatively small scales. Trucking in sand from non preserve areas or from sand and gravel operators has already been employed at a very small scale with apparent success. This program could be expanded if necessary, but would be difficult to increase to a level that would be meaningful at a CVFTL population level.

Sand fencing is planned to be installed to retard sand loss on the down-wind side of some preserves. If successful, this program could easily be expanded.

Additional adaptive management programs will certainly arise over time as new threats to the preserves become apparent. Satellite images at 4 m resolution, coupled with ground truthing will be a useful tool in evaluating the efficacy of any of these programs; if the results are not apparent at that resolution, then the strategy may not have sufficient benefits at the scale the preserves would require.

C. Research. The Coachella Valley Preserve System is available for, and encourages, research endeavors that are not antithetic to the goal and attendant objectives of the preserves. To the extent that funds are available, the Management Committee could authorize CNLM to provide funding for research projects that have a direct bearing on the ability of managers to meet our goal and objectives. Research that helps managers understand the impact of exotic species

on CVFTL and their habitat, and research that develops control methodologies, would certainly meet that criteria.

Special use permits will be required to be obtained by any researcher. The landowner where the research is occurring will issue these permits.

D. Habitat Restoration Efforts. The majority of habitat restoration within the preserve will fall into three categories: removal of exotics deemed detrimental to the CVFTL habitat, removal of obstacles to the natural processes delivering aeolian sand, and if necessary, activating stabilized areas. All of these efforts would be conducted under an adaptive management program. No vegetation plantings to accelerate restoration of old agricultural areas are envisioned at this time.

E. Exotic Weed Control. All tamarisk trees will be removed from the preserve areas. A Section 7 consultation has previously been completed for this activity. Any large trunks, root masses or branches of tamarisk will also be removed to promote sand movement. In those areas where tamarisk trees are retarding down-wind loss of sand off of preserve boundaries, sand fencing will be installed prior to removal of the trees. In Thousand Palm Canyon searches for, and removal of, newly established tamarisk seedlings need to be conducted annually.

The other known weeds, such as russian thistle, mustard and *Schizmus* have no known effective control methods. They are all annuals that have potential negative impacts only after particular rain amounts and timing of the rain events. Before control efforts are contemplated, research needs to verify long lasting negative impacts and then control methods will need to be developed. These efforts will be conducted under an adaptive management framework.

F. Guidelines for Sensitive Species. No activities will be allowed that knowingly impact CVFTL or their habitat negatively. Section 7 Consultations will be conducted for all new activities within CVFTL habitat. There is the potential for conflicts between managing for CVFTL habitat at the expense of habitat for Palm Springs pocket mice or flat-tailed horned lizards which either prefer or tolerate more stabilized aeolian habitats. For this reason, habitat manipulations will only be conducted under critical need scenarios, with consultations with the USFWS and the whole management committee, and with an evaluation of both short term and long term results / impacts.

All research and monitoring activities in CVFTL habitat must be conducted under the supervision of persons holding federal and state permits that allow those activities.

G. Public Use. Public education of the values the preserves provide and having the public consider the preserve system as a community asset are programmatic objectives for the preserve system. Public use can be a means to partially meet those objectives, as long as it is not in conflict with the ecological objectives for the preserve.

Public use in terms of passive recreation has been, and will continue to be, conducted almost exclusively in the non CVFTL habitat areas of the Thousand Palms Preserve. These areas are under the ownership of BLM, State Parks and the Nature Conservancy. A nature center has been created in a historic log cabin in Thousand Palms Canyon and from that point of contact visitors receive information on trails, preserve function and history, and rules for access. A volunteer docent crew serves as the primary contact with most visitors. Those docents are trained and managed by CNLM staff. Approximately 40,000 visitors from around the world visit the preserve in this fashion annually. Approximately 10-15 miles of trails are maintained for public access.

Rules of access include:

1. No pets
2. No smoking in the palm oases
3. No vehicle use off of paved roads (except for management purposes or special permit [Covered Wagon Tours])
4. Horses only on designated trails
5. No overnight camping except by educational groups in the designated group camp site in Thousand Palms Canyon and by pre-arrangement only.
6. Commercial tours must have written permission from CNLM and the agency landowner which will be available only after an agreement to abide by all of the rules above, and provide proof of adequate insurance.
7. Horses must stay out of palm oases.
8. No collecting of any natural feature without a permit from the agency landowner.
9. No unauthorized access to any dune or pond area (swimming or wading).

On the BLM owned lands at the Willow Hole Preserve, wind energy development is allowed. A section 7 consultation between BLM and the USFWS addresses provisions for wind energy development. Those provisions include avoiding construction and road development on CVFTL habitat.

For all the preserves, CVFTL habitat will be only accessible with a special use permit. Limited tours on CVFTL habitat for the public may be offered, but must be under the direct supervision of Preserve System staff. An elevated boardwalk may someday be constructed to provide the public with a “dune experience” but only if outside funds are available for construction (estimated cost in 2000 is \$55,000).

Standardized signs currently exist for marking the boundary of the Coachella Valley Preserve System, and individual land agencies may augment those signs with their individual agency’s sign. Any changes to the current sign will require the concurrence of all voting members of the Management Committee.

H. Cultural and Fossil Resources. There are many areas within the Willow Hole and Thousand Palms Preserves where evidence of past Native American use can still be found. During the late prehistoric and protohistoric periods, the Coachella Valley was inhabited by the Desert Cahuilla. Historic properties located within the preserves can be expected to include trails, milling features and artifacts, cairns, and camp or village sites.

All artifacts will be left in situ or avoided unless moved and recorded by a professional archaeologist under the permit and direction of the agency landowner. National Historic Preservation Act Section 106 review will be completed for all new activities within the preserves. Additional fencing around sensitive areas such as sand dunes shall be installed to minimize intrusions, and surveys shall be periodically conducted to check for newly exposed cultural sites within sand dunes.

There are scattered fossil remains found on the Thousand Palms Preserve. A fossil oyster bed can be found to the west of Willis Palms, and a State Park paleontologist discovered the remains of an imperial mammoth east of Horseshoe Palms. There are reports of widely scattered fossil camel and horse remains throughout the formation that includes the Indio Hills and the Mecca Hills. As with cultural remains, all such fossils will be left in situ unless removed by a professional paleontologist under permit and direction of the agency landowner.

I. Real Estate and Land Acquisition Issues. At the point when this plan was prepared there are still two private parcels within the original boundary of the Thousand Palms Preserve (10 and 5 acres) still needing to be acquired. The private landowners are not yet willing sellers, but mitigation funds are set aside to acquire them when they are available.

There is an acute need to acquire lands outside the original boundary of the preserve, within the sand corridor leading to the Thousand Palms Preserve. The USFWS is developing a Refuge expansion proposal that would allow the use of federal Land and Water Conservation Funds to acquire lands there. CDFG has developed a Conceptual Area Plan enabling use of state Wildlife Conservation Board funds in the same area. CVFTL HCP mitigation funds are also available, through an amendment to the HCP, for acquisition in the sand source as well. A state agency, the Coachella Valley Mountains Conservancy, has taken a lead in acquiring lands and coordinating funding sources there. At some point the lands will be aligned into USFWS and CDFG blocks to simplify ownership issues, but in the interim CNLM may accept ownership of particular parcels.

Additional land acquisition is important at both the Willow Hole and Whitewater River Preserves to both protect additional habitat and to protect sand source corridors. If opportunities arise such as particular mitigation requirements for unauthorized habitat take, those opportunities should be targeted in those areas.

All privately held lands targeted for acquisition will be acquired through willing sellers at appraised fair market values (unless the landowners wish to make a charitable gift).

J. Coordination and Partnerships. The management of the Coachella Valley Preserve System is conducted under the supervision and approval of the Management Committee. The Management Committee is comprised of the of the federal (BLM, USFWS - Refuge Division) and state (CDFG, State Parks) land owners as well as the non-governmental organization (NGO) landowner/managers (TNC, CNLM). Each of these six members is a considered a “voting member”. The committee determines overall policy by consensus, and issues pertaining to a single agency landowner are decided by that agency. Additional to the six “voting members” there are advisory members to the committee which participants from the USFWS - Carlsbad Office, and the University of California Deep Canyon Desert Research Center. The committee meets as needed, usually about every 8 - 10 weeks. Meeting facilitation is handled by CNLM. Other agencies, including CVWD and staff from Riverside County are encouraged to attend meetings for information purposes.

Management Committee meetings are open to the public and the public is welcome to bring any items or issues to these meetings for the consideration of the committee. If so interested, the public should contact CNLM (760 343-1234) to be added to the agenda for the next meeting.

VII Funding and Reporting Mechanisms.

CNLM receives CVFTL HCP mitigation fees (currently \$600/acre) from the city and county permit holders. Those fees are available for both land management and additional land acquisition needs, and are added to mitigation funds once collected and invested by TNC, that have now been transferred from TNC to CNLM. There is a proposal being evaluated that would raise the mitigation fee back to its \$600/acre original level. This is being contemplated as a means to fund additional acquisitions within the sand source areas omitted in the original preserve design. A previous amendment to the CVFTL HCP allows the use of mitigation fees to acquire and manage lands within that sand source area.

In February 2000 TNC transferred \$6,034,459.56 to CNLM. CNLM will place \$ 3,000,000 in a long term investment vehicle to be used as a permanent management endowment. CNLM will direct the investment of these funds enabling them to grow to offset inflation and meet management needs into the future. The interest from this endowment provides for all

management costs. A cost analysis is presented (Figure 8) that includes the range of tasks that are required to maintain the preserve system in its current condition and to address the management actions indicated in this plan. This analysis includes hours for activities currently being handled by volunteer labor including building maintenance, trail maintenance, docent coordination, production of visitor information, and exotic species removal. These are essential tasks that are required to maintain the Thousand Palms Preserve in its current condition, but have not been funded due to lack of available financial resources. The cost analysis does not include the cost of funding the Coachella Valley National Wildlife Refuge Manager (see below). At such time that the USFWS covers the costs of the Refuge Manager, an additional \$40,000 will be available for managing the Coachella Valley Preserve System. At that time, the Preserve Management Committee can determine if the available funds will be directed toward hiring an Assistant Preserve Manager (as was the case prior to funding of the Refuge Manager), or will be directed toward some other preserve system need. Because of the addition of the hours for an Assistant Preserve Manager, the cost analysis is not a proposed annual budget.

A sum of \$40,000 per year has been agreed by the Management Committee to be provided to the USFWS Refuges division, to support a Refuge Manager position for the Coachella Valley National Wildlife Refuge, through FY 2002. After that year, the USFWS Refuges will fund that position. These costs are also supported by interest from the management endowment.

Other mitigation funds transferred from TNC or collected from the city and county permit holders will be used to acquire privately held lands within the original preserve boundaries and those lands in approved expansion areas deemed essential to maintaining the population viability of CVFTL within the Preserve System.

CNLM will provide annual reports to the management committee on the status of the invested funds, budget and cost analyses, and a summary of all management activities, including ecological monitoring results. At the Management Committee meeting prior to the beginning of the fiscal year (October 1 for CNLM), CNLM will provide the reports on the previous year's activity, as well as a proposed budget and workplan for the following year.

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IX. Decision Record

This Decision Record hereby approves and puts into effect the attached Coachella Valley Preserve System Management Plan, which outlines management guidance and actions for conserving the Coachella Valley fringe-toed lizard and other species protected within the Preserve System. Each of the Preserve System Management Committee members, whose authorized officers' signature appears below, is committed to implementing this plan and ensuring consistent management throughout the Preserve System. These decisions do not apply to private land not under the jurisdiction of one of the Management Committee members.

draft

Field Manager, BLM

Date

draft

Regional Director, USFWS

Date

draft

Region Manager, CDFG

Date

draft

Superintendent, Salton Sea Satellite District, CDPR

Date

draft

Regional Director, TNC

Date

draft

Executive Director, CNLM

Date